CARBONATE RAMPS VS RIMMED SHELFS:
Constrains from Numerical Simulations

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Sedimentary numerical simulations became a powerfull analytical tool. Depositional processes can be interpreted from different types of records (i.e. outcrops, well cores, well logs, seismic sections), leading to an evolutive geologic model. The aim of sedimentary modeling is to support and constrain the construction of these models.

Based upon real data obtained from Oligo-Miocene carbonate systems from Cumuruxatiba Basin, offshore brazilian east coast, synthetic geologic sections were produced to study the evolution of a ramp-type system into a rimmed shelf one.

Several syntetic situations were tested by numerical simulations to constrain factors controlling the stratigraphic evolution and internal architecture.

Major conditioning parameters are subsidence rate, eustatic variations and rate of carbonate production. Geologic scenarios tested were as follows:

(1) simple subsidence architecture (no eustatic variations)
(2) low frequency eustatic cycles;
(3) high frequency deposicional cycles; and
(4) composite low plus high frequency cycles

The simulations indicated that the key factor controlling the conversion is the balance between acomodation space (tectonic and eustatically created) and rate of carbonate growth at a low frequency scale (3^{rd} order processes, related to a 1 - 5 Ma time scale). Nevertheless, the internal characteristics of the ramp or platform would be related to the high frequency depositional cycles (Milankovitch order).